

#### Cause

Tuberculosis (TB) is a bacterial disease of the respiratory system. Of the three major types of TB (human, avian, and bovine), bovine TB has the greatest host range and is known to infect many species of mammals including humans. Bovine TB (BTB) is caused by the bacteria *Mycobacterium bovis*.

### **Significance**

Humans can become infected with bovine TB by consuming contaminated cow milk or by handling contaminated tissues or materials from infected cattle. Pasteurization has significantly decreased the number of human cases of bovine TB in the United States, and the likelihood of humans contracting this disease in the US is currently remote, except in certain groups such as hunters, farmers, and slaughterhouse workers who are at greater risk.

In the past, bovine tuberculosis was the most prevalent disease of domestic cattle and swine in the United States, and it caused major losses to the agricultural industry. A nationwide eradication program has nearly eliminated the disease from US domestic livestock and has also contributed to the large decline in the number of human cases. However, Michigan and Minnesota have recently had confirmed cases of bovine TB in cattle and hunter killed deer.

# Species Affected

M. bovis can cause infection in most mammal species. Some wildlife species susceptible to bovine TB include white-tailed deer, mule deer, elk, bison, black bears, bobcats, coyotes, opossums, raccoons, and foxes. Many domestic animals can also be infected including cattle, swine, and cats.

## **Distribution**

BTB has a worldwide distribution and is more prevalent in Africa and parts of Asia and the Americas. The disease was most likely introduced to North American wildlife when European cattle were brought to the continent. Bovine TB was once common throughout United States cattle herds, but the eradication program has nearly eliminated the disease from domestic animals. Tuberculosis occurs sporadically in free

ranging and captive deer throughout the world. Currently there are management efforts to control bovine TB in wildlife in Africa, Europe, North America, and New Zealand, but it is likely that the disease is present, though undiagnosed, in wildlife in other parts of the world. Canada, Great Britain, New Zealand, Sweden, and the United States have all reported bovine TB in farmed deer or elk.

Until 1994 bovine TB was considered a rare disease of wild deer in the US, with only 8 known cases of the disease in white-tailed deer and mule deer in North America prior to that year. In 1994, Michigan began to routinely survey their wild deer population for bovine TB after a hunter killed white-tailed deer was reported positive. Michigan found a prevalence rate of greater than 4% in free ranging white-tailed deer. In 2005, there were 18 cases of bovine tuberculosis in hunter killed free-ranging deer in Minnesota. This disease has not been diagnosed in Pennsylvania's wild deer herd to date.

### **Transmission**

Bovine TB can be transmitted by inhalation or ingestion. Infected animals spread the bacteria by coughing or sneezing, so the disease is more likely to spread when animals are in close contact with one another. The disease can be transmitted from domestic cattle to wild deer and vice versa. Predators and scavengers such as coyotes and foxes can acquire bovine TB by consuming infected deer carcasses. *M. bovis* can survive in the environment for at least 5 months in cold, damp conditions. The bacteria survive

less than 4 weeks in dry conditions with direct

sunlight.

## **Clinical Signs**

Bovine TB is a chronic disease and clinical signs may not appear until several years after initial infection. One of the earlier clinical signs in deer may be enlarged superficial lymph nodes due to abscess formation. These abscesses might drain pus through the skin. Infected animals often gradually become emaciated and depressed. If the lungs are severely affected deer may exhibit coughing, nasal discharge, and difficulty breathing. Some animals will show no clinical signs, and some will die suddenly without showing clinical signs.

Hunters may not notice pathological lesions in infected deer. Abscesses may be found in lymph nodes throughout the body as well as in the tonsils. When cut open, these nodules contain yellow-green or tan pus. Tan or yellow lumps may be found throughout the chest cavity and in the lungs. The lungs may also develop dark and firm areas.



Photographs courtesy of the Michigan Department of Natural Resources

## **Diagnosis**

If an animal's post mortem examination suggests tuberculosis, further diagnostic tests must be conducted to confirm the diagnosis.

#### **Treatment**

There is no treatment for Bovine TB in wild deer and there are currently no effective vaccines.

## **Management/Prevention**

In 1917 the United States began a bovine tuberculosis eradication program, and the disease has been nearly eliminated from the nation's livestock. Pennsylvania achieved TB free status in June of 2000. Tuberculosis can pass between domestic livestock and free ranging wildlife, so the presence of the disease in widely scattered individuals within free-ranging populations makes it difficult to completely eradicate. These individuals as well as management practices that congregate domestic livestock and wild deer pose a potential threat of reintroducing TB to domestic herds and nearby wild populations. Management techniques that can help keep the disease under control include surveying individual animals for TB, decreasing deer population density, and preventing supplemental feeding.

## Suggested Reading

Bovine Tuberculosis. General Disease Information Sheets. OIE: World Oraganisation for Animal Health. < http://www.oie.int/en/animal-health-in-the-world/disease-information-summaries/>.

Bureau of Animal Health and Diagnostic Services. Tuberculosis. Pennsylvania Department of Agriculture. <a href="http://www.portal.state.pa.us/portal/server.pt/gateway/PTARGS\_0\_2\_24476\_10297\_0\_43/http%3B/10.41.0.36/AgWebsite/ProgramDetail.aspx?name=Tuberculosis&navid=12&parentnavid=0&palid=43&>.

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Michigan Department of Natural Resources. Wildlife Disease. Bovine Tuberculosis. <a href="http://www.michigan.gov/dnr/0,1607,7-153-10370\_12150\_12220-99064--,00.html">http://www.michigan.gov/dnr/0,1607,7-153-10370\_12150\_12220-99064--,00.html</a>.

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